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USSR Report

ENERGY

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OIL AND GAS

URENGOY, YAMBURG TOO SLOWLY DEVELOPED

Moscow PRAVDA in Russian 21 Jan 85 p 2

[Article by V. Lisin, PRAVDA correspondent, from Tyumen Oblast: "The Gas Potential", under the rubric "Combined Development of the Fields Is a Potential Fuel Saver"]

> [Text] The main center for gas recovery is the Tyumen North. During the present five-year plan period, the Urengoy gas-condensate field has provided the entire All-Union increase of this resource. The immediately impending five-year plan periods will see this happening outside of Yamburg, where a new recovery center is to be organized. How is the development and the opening up of the natural gas storehouses going?

URENGOY

An unusual jubilee was celebrated recently in Novyy Urengoy: on a day ten years ago during a December blizzard, a pioneer machine-tractor work group from Nadym forced their way through onto the steep, snow-covered bank of the Yevoyakhi River. Now, the largest gas field in the country is here. In the cold tundra, there is a many-storied city, lit up by flares. This is the first time in world practice that such a huge gas-recovery center has been established near the Arctic Circle. However, even this is not as impressive as the speed with which this remote territory has been transformed. Urengoy has secured the key position in the country's economy.

"Right now we're at work on a method of completely automating the gas recovery process", said Chief Engineer of the Urengoygazdobycha [Urengoy Gas Recovery] Association, R. Suleymanov. "This will permit wider utilization of the potential of the dispatcher administration, and will reduce the number of maintenance personnel to the minimum: instead of constant duty at the installations, there will be periodic checking and repair servicing."

It should be acknowledged that science has been rendering effective aid in the development of this region. But, as the association's chief engineer believes, the contribution from science could have been much greater. The more so, since it was Urengoy itself which raised a number of scientific and technical problems specifically for the gas industry of the Far North.

Each of various scientific institutions keeps several groups of its associates in Novyy Urengoy. VNIIPIgazdobycha [possibly All-Union Scientific Research and Planning Institute for Gas Recovery] and TyumenNIIgiprogaz [possibly Tyumen Scientific Research and State All-Union Institute for Gas Pipeline Planning and Gas Industry Enterprises] and other institutes here have many minor cells, departments, subdepartments and sectors. So papers travel from Urengoy to the Center and back, but locally there remain innumerable conflicts and agreements....If all the specialists were to be gathered together (and there are about 200 of them) into a single integrated scientific research and planning center, then, as R. Suleymanov believes, a considerable effect could be obtained.

The role of science is important, not only for the correct operation of the field, but also for the correct construction of the field's surface facilities. In fact, up to now, Urengoy still remains essentially a gigantic construction project, which exceeds the BAM [Baykal-Amur Main Line Railroad] in capital intensiveness.

Now the question arises of whether the gas workers are getting a raw deal from the oil workers, when, because of the lag in preliminary surface facility construction and the unintegrated nature of the development, the natural resource wealth of some Central Ob Region fields, including the well-known Samotlor Field, was used irrationally. The fact is that Urengoy suffers a chronic lag in well-drilling, intra-field pipeline construction, in putting over-gas treatment installations into operation, in establishing a reliable material and technical supply center and housing, and so on.

Even if new construction were brought to a halt, and the entire work force directed to complete unfinished work, it would take about two or three years. The fact of the matter is that gas recovery is about to reach its planned level, but only 22 percent of the construction has been completed. There's a considerable disproportion here. Meanwhile, the growth rates for recovery continue to climb steeply. But this "forced march" manner of field development requires a comprehensive approach before anything else.

Glavurengoygazstroy [possibly Main Urengoy Gas Construction Administration] is only three years old. However, the responsibility it bears for construction of surface facilities for the gas fields of the North is not too great for an enterprise that young. You have to admit that the Ministry of Construction of Petroleum and Gas Industry Enterprises took a bold, and even risky, step in having "transplanted" its main administration to Novyy Urengoy. There had been no similar prior experience in bringing a main construction administration to a field in the extreme conditions of the Far North.

Life has corroborated the correctness of this decision. The development rates for this field have markedly accelerated. Thus, if in all the years preceding the establishment of a main administration in Urengoy, R225,000,000 of construction and installation work had been completed, then about R1,000,000,000 has been done in just the last three years.

The construction workers are not standing around idly. Every year, they increase their work volume by 50-60 percent. That's not bad. But the fact is, the gas workers need to build even more. Now the problems are starting to snowball. Cooling stations, gas-treatment stations, powerful pressure normalization and main gas compressor stations are needed.

Up to now, the Urengoy workers have been developing only the Cenomanian deposits, which are located at a depth of 1,200 meters, where predominantly methane is found. Now they have started toward a deeper stratum, containing condensate and petroleum. Recovery of these valuable hydrocarbons during this five-year plan has already been planned for Urengoy. The construction of facilities to develop the Valanginian deposit is more complicated and expensive than for the Senomanian because the pressure deep in the earth here is twice as high.

Roads constitute the first condition allowing the quick and high-quality development of a field. The construction of these roads must anticipate the start of recovery by at least a year, and happens in reverse. The rail line, which is the most reliable tranport network, came to Novyy Urengoy when half of the combined gas-treatment installations had already been built. It cannot be said that the measures for a sharp increase in road construction were not taken. A special trust was set up. However,it has no corresponding material and technical center.

It's the same with the power production workers. This field has hitherto had no reliable power supply. The power transmission line supports are falling over. There are not enough substations. This is not the first year that criticism has been delivered to the Mintransstroy [Ministry of Transport Construction] and Minenergo addresses. But no radical change in the situation is evident. The main construction administration in Urengoy should be given more independence. For now, everything, up to and including the last kopeck, is planned and approved by the ministry. And that is why the projects quite often do not coincide with the plan. Life does not stand still, it makes its own corrections. Reaction to the changing situation from the local leaders should be quicker.

YAMBURG

Yamburg, which has only recently obtained the civil law of a settlement, is snowed in up to the roofs. The multicolored boxcars form short streets which are cleared almost daily by powerful bulldozers. The industrial area is nearby, with its warehouses, garages and shops.

Urengoy is located in a zone of severe weather, but it looks southern in comparison with Yamburg. The Tazovskiy Peninsula is as flat as a table, and there is no shelter from the icy Arctic wind. Temperatures of less than 50° below zero are not rare.

The Yamburg gas-condensate field is a match for Urengoy. It's just that the retrieval of the mineral wealth here is more complicated. It is protected by a layer of permafrost which is many meters thick which thaws to mere centi-

meters during the short cool summer. Since the day the first workers got here, and that was three years ago, several tens of millions of rubles' worth of work has been completed here. Is this a lot or a little? Of course, when compared to the fact that at just the gas field's start-up complex about R1,000,000,000 are to be spent, little has been done. But they are also incomparable with regard to the scope of these two stages: the pioneering trek out to the area, and the start-up of their industrial surface facility construction. And there is still one more reason they cannot be compared: during the first two years here, the interested ministries were unable to organize a single subdivision here, other than a board of directors and a production and technical supply base for construction of the surface facilities. Everything, or almost everything which has been done in the field today originated with a local initiative, and through the use of the internal reserves of gas-extraction and construction workers' collectives.

The pioneers of this arctic field had a dream: to come, along with the other departments, to a scaled opening up of the field with already-prepared social and production supply systems in order to achieve the central objective, which is to extract the wealth of the subterranean storehouses at the lowest cost. But the solution to the problems of vital provisions has already collided with the industrial development in this field. At present, a situation has arisen which has been encountered at Medvedevo and Urengoy: productive capacities need to be increased, and poor supply systems interfere with their development.

Until recently the development of Yamburg proceeded on the level of a section chief. But Mingazprom [Ministry of the Gas Industry] organized the Yamburggazdobycha [Yamburg Gas Extraction] Association, and Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises] created a special main administration. In the best of cases these subdivisions have developed their full potential only this year. And the gas from Yamburg is supposed to be piped to Yelets by the beginning of the upcoming five-year plan. How is this lost time to be made up?

The extreme conditions of the Yamburg field, and this also means the restricted time periods prior to the time limit, dictate the furdamentally new method of developing this field. It has been suggested that this subterranean storehouse be built in Tyumen. In the oblast center, in the Sibkomplektmontazh [possibly Siberian Comprehensive Procurement Installation] Association's enterprises, they have already begun to develop, not separate block boxes, but large-sized elements for the future buildings and industrial structures. They are to be transported on special pontoon foundations to the Yamburg port by water. Then they will go overland a few dozen kilometers to their assigned site.

Nor have the operational personnel been left aside. They have decided to use a drilling innovation. Gas wells are technologically more complicated than oil wells. That is why slant-hole directional drilling is almost never used for gas wells. This method is to be used widely at Yamburg, as it permits up to 10 wells to be drilled from a single "cluster". And, too, there is

the considerable saving of time, in that time spent in transferring the drill-sites to other locations.

On this occasion the subcontractors became somewhat more active. The transport workers stretched a steel rail line from Novyy Urengoy here, the power industry workers erected a high-voltage power transmission line, and the pipeliners set to work on a large pipeline.

The encroachment into the Far North on a wide front, is more often and more acutely becoming a problem of special transport. Of course roads are needed, and sooner or later there will be roads. But the entire tundra cannot be covered with asphalt. But this is hardly necessary, since each well has its own road. The fact that fundamentally new forms of transport equipment needed to be developed ,which are based on the achievements of science and technology, was discussed at the 26th CPSU Congress. This pertains primarily to regions such as Siberia. The Tyumen North has hitherto been developed using standard equipment. In this case, swamp-traversing vehicles, hovercraft and airships are only dreamed of. Serious science is not occupied with new modes of transport, this being the lot of enthusiasts.

Yamburg has played more light on many problems and made them more acute. And not only technically, but technologically. And here, unfortunately, is where most of the unresolved tasks are. In the Arctic, life seems particularly fragile and violable. It is very easy to harm and difficult to restore. And, at any rate, social and economic problems take precedence. First of all the effect of arctic conditions on human health must be reduced, his fitness for work must be improved, and his psychological state must be improved in the bargain. A workers' settlement has been set up, and now its fate must be determined: should a City of Yamburg be built, or should shift workers be driven there from other, more southerly, locales? For now, the argument goes on, and in the new settlement, children are being born.

SAVING HEAT

Natural gas is an invaluable gift of nature, the supplies of which are not replaceable. The government is spending massive amounts of money, and people are displaying great courage to recover it in extreme climatic conditions. It is for this very reason that a search for resources for the rational and economical utilization of gas is one of the paramount tasks of the national economy.

As is well known, the primary consumer of gas is the municipal utility sector, which uses it for heating, cooking and heating water. The level of gasification of cities and settlements is steadily increasing. The advantages of using gas commercially are also well known: many manufacturing methods are automated, and equipment productivity increases and there is a concomitant improvement in the sanitary-hygienic aspect of working conditions.

This year's severe winter has been a harsh test of the gas recovery workers. They are going through this examination with honor: the sector has managed their last year's assignments ahead of schedule. The Tyumen Field workers

have gone to the limit by recovering 1,000,000,000 cubic meters of gas per day. However, their indisputable successes should not create an illusion of limitless, cheap sources of natural resources. The careful expenditure of natural gas, as of other power production resources, must become the law for every worker. And this should hold true not only in everyday life, but first and foremost in the chemical and construction industries, and in power engineering, where demands for this particular raw material are particularly high.

Rational and economic consumption of gas, the introduction of new equipment, progressive gas-burning devices, automation equipment, and fuller utilization of secondary power resources will allow up to 35,000,000,000 cubic meters of gas per year to be made available for the needs of the national economy. This is equivalent to the output of the huge Urengoy-Pomary-Uzhgorod gas main.

Urengoy is in operation. Yamburg is under construction. But both of them are coursing toward tomorrow, so that their great gas rivers can carry the fire which will warm the country.

12659
CSO: 1822/150

6

OIL AND GAS

BRIEFS

NEW OIL EXTRACTION INSTITUTE--An institute for problems concerning the geology of oil and gas extraction is being created in Moscow as part of the geology, geophysics and geochemistry department of the USSR Academy of Sciences. Its basic purpose is to create new methods and integral systems for developing oil and gas, gas condensate and oil and gas condensate deposits which insure the maximum extraction of fuel. Also in the institute's program is a study of the prospects for the development of oil extraction in the country, the determination of the efficiency of the exploitation of deposits and the working out of geophysical, geochemical and space methods for searching for new deposits. The institute has also been given the duty of coordinating the activity of the scientific institutions of the USSR Academy of Sciences and the academies of the union republics concerned with the problems of oil and gas. [Text] [Moscow Domestic Service in Russian 1330 GMT 11 Feb 85 LD]

CSO: 1822/180

NUCLEAR POWER

SMOLENSK AES CONSTRUCTION PROBLEMS NOTED

LD221531 Moscow Domestic Service in Russian 0900 GMT 22 Feb 85

[Editorial Report] Thousands of workers are currently engaged on the construction of the Smolensk AES. Work is being completed on the second set of the station's first stage. The construction of the second set is virtually complete. Last year 67 teams were declared winners in socialist competition. Some years ago many thousands of man-days were lost every year because of poor discipline. The situation is completely different now. Loss of working time has been virtually eliminated.

"[Correspondent Aleksandr Levchenko] A large construction project raises quite a few problems. Some of these are tackled by the workers themselves. Others have to be sorted out by other departments. One of these problems is causing particular concern to the man in charge of the construction work."

"Boris M. Reva, head of the directorate responsible for the construction of the Smolensk AES. Construction of the second stage is scheduled for the 12th 5-Year Plan. The third set must be commissioned in 1987. The fourth set must be commissioned in 1989. The task of carrying out this program is, of course, an honorable one for our work force. We are getting ready to accomplish this. Unfortunately, we are not getting the assistance we need, above all from the organization responsible for general design work, the Gidroproyekt organization. Thermal assembly workers have not received any documentation whatsoever for the second stage. When Gidroproyekt adopts this sort of attitude, it is of course extremely difficult for our electricians to get their work organized. The achievements we have to our credit at the moment could be nullified. Besides the main building we are responsible for 74 other projects for which, unfortunately, we have not yet received documentation. So, the main question for our work force at the moment is the question of technical documentation."

"(Levchenko) One hopes that the designers will be able to speedily solve this question, which is such an urgent one for the building workers. After all the many thousands of building employees here are working wonderfully well and they intend to go on working that way."

CSO: 1822/178

NON-NUCLEAR POWER

BRIEFS

UZBEK THERMAL POWER PLANT--A new thermal power plant has been put into operation in Angren, the Uzbek SSR. Local coal mines will provide the new power plant with the energy it requires to generate electricity. The new power plant is as much important to the other Central Asian republics as it is to the Uzbek SSR. According to the Uzbek SSR's social and economic development plan for 1985, power generation will be increased by one-third over the figure achieved in 1980. This will be achieved through new power generating installations. [Summary] [Tashkent International Service in Uzbek 1700 GMT 17 Feb 85 GF]

THERMAL POWER UNIT OPERATIONAL--The first power unit of the Novoangrenskaya GRES with a power capacity of 300,000 kW began supplying power to Tashkent, Almalyk, Chirchik and other industrial centers of Uzbekistan via a united Central Asian power grid. The Novoangrenskaya thermal power station will become one of the largest in Central Asia. [Summary] [Moscow Domestic Service in Russian 2330 GMT 16 Feb 85 LD]

CSO: 1822/179

PIPELINE CONSTRUCTION

PIPELINE CONSTRUCTION PROGRESS REPORTED

Moscow EKONOMICHESKAYA GAZETA in Russian No 2, Jan 85 p 6

[Article by V. Voznyak: "On the Gas Pipelines: Status at the Outset of the Last Year of the Five Year Plan"]

> [Text] Of the 3,032 kilometer total length of the pipeline as of 1 January 1985, 2,740 kilometers of the Urengoy-Tsentr II Pipeline have been welded together, including 2,614 kilometers which have also been insulated and laid. The pipeline operator has already taken possession of a large part of the pipeline and is operating it. On some sections of the pipeline workers are conducting tests and start-up operations.

During the last month of 1984 the work of construction, assembly, trouble-shooting and operations collectives on the construction of the gas pipelines was especially strenuous. Despite difficult weather conditions in December and especially severe cold in Western Siberia, the Urals and in the Volga region, the line portion of the Urengoy-Tsentr II Pipeline was laid at a rapid pace.

More than 400 kilometers of pipeline there were insulated and laid in the month. Of the main administrative units of Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises], the collective from Glavsibtruboprovodstroy [Main Pipeline Construction Administration of Siberia] headed by P. Shabanov completed the most work on the pipeline in December (195 kilometers), and the Severtruboprovodstroy Trust [Northern Pipeline Construction Administration] of the same ministry (headed by A. Sazhnev) completed construction of the 310 kilometer section assigned to it ahead of schedule.

Among the spreads, collectives led by I. Kirichenko, Kuybyshevtruboprovodstroy Trust [Kuybyshev Pipeline Construction Trust], B. Kuksha, Soyuzgazspetsstroy [All-Union Administration for Special Construction in the Gas Industry], B. Mikhaylyuk, Kazymtruboprovodstroy [Kazym Pipeline Construction Administration], I. Shaykhutdinov, Tatnefneprovodstroy [Tatar Oil Pipeline Construction Administration] and O. Gorbunov, Omsknefteprovodstroy [Omsk Oil Pipeline Administration] achieved the best results in socialist competition.

Operations are expanding at the construction of the new Yamburg-Yelets Pipeline. Here by the end of December 1,220 kilometers of pipe have been welded together on stands, 475 kilometers of welded sections have been delivered to the pipeline route, 270 kilometers of pipe have been welded into the line, and 150 kilometers insulated and laid underground. The pace of operations is increasing at the rate at which production lines are being freed from the Urengoy-Tsentr II Pipeline.

Workers engaged in laying river crossings had a successful December. They laid an underwater pipe across the Vyatka River on the Urengoy-Tsentr II Pipeline; other underwater crossings on the same line across the Volga, Ilet and Chusovaya rivers are at the completion stage. On the Yamburg-Yelets route crossings of the Nadym and Don rivers are already completed, earth moving operations in preparation for laying the pipeline across the Ob and Volga rivers are in progress and preparations for traversing other water obstacles are taking place.

Workers have completed a great deal of work in the construction of compressor stations on the Urengoy-Tsentr I Pipeline. They built the Verkhnekazymskaya Compressor Station in Tyumen Oblast on the gas pipeline Urengoy-Tsentr II ahead of schedule.

Crucial tasks face pipeline workers in 1985. They must put the whole Urengoy-Tsentr II Pipeline into operation in the near future and lay a large part of the new Yamburg-Yelets Pipeline. According to plan they must provide a series of large distribution pipelines including the 500 kilometer Kursk-Kiev line and the Yelets-Serpukhov line of about 300 kilometers. The 1985 plan provides for the construction of a number of underground gas storage facilities.

8750
CSO: 1822/130

GENERAL

USSR AIDS INDIA IN OIL PRODUCTION, REFINING

Moscow MOSCOW NEWS in English No 7, 1985 p 4

[Text] **The Soviet Union and India have been cooperating in the economic, scientific and technological fields for thirty years now. Nikolai MALTSEV, Minister of the Oil Industry of the USSR, reviews the Soviet Union's assistance to India in oil production and refining at the request of our correspondent Yuri Aizman.**

India today produces 67 per cent of its oil requirements. It still has to import the balance, one-third, which is a considerable part.

However, this fact does not in any way diminish the importance of what has been achieved by the Indian oil industry. On the contrary, it has become increasingly clear now how much wisdom and insight Indian leaders have shown, primarily the country's first Prime Minister Jawaharlal Nehru, in deciding to conduct large-scale prospecting for oil and gas in the country. This was at a time when Western experts claimed that the country had no commercial deposits of these energy fuels.

This deliberately fabricated myth was exploded through the joint efforts of Soviet and Indian oilmen. At the Indian government's request and in cooperation with their Indian counterparts, Soviet geologists produced a programme of geological surveys and started drilling prospecting holes. Their efforts were crowned with success. Major deposits of oil and gas were found at Cambay, Ankleswar, Rudrasagar and in a number of other areas. India, which not long ago was fully dependent on major international companies for oil, now rightfully belongs to the world's oil-producing countries. At present there are nearly 50 oil and gas fields in operation on dry land in India. More than 40 of them were discovered with Soviet assistance.

Off-shore prospecting has also been started. Soviet engineers on board the seismic-prospecting vessel Akademik Arkhangelski carried out wide-ranging surveys off India's western coast. Data thus obtained enabled them to speculate about the presence of major commercial deposits of oil and gas there. The forecast proved correct. Today more than two-thirds of India's oil is produced in the sea off Bombay.

India now faces the task of becoming self-sufficient in oil. To accomplish this oil production in the operating fields must be intensified, and prospecting for more deposits must be stepped up. Soviet and Indian experts are currently conducting geological and geophysical surveys in the valley of the Ganges at Tripura, in Rajasthan, West Bengal and a number of other areas.

According to estimates made by Soviet and Indian experts, India will receive at least one million tons of additional oil annually if it puts into operation wells that are currently lying idle for various reasons. Two Soviet repair teams are now at work in India's western oil-producing region. The work is to be expanded very soon.

India's oil industry has greatly gained in strength during the years of cooperation between Soviet and Indian oilworkers. The industry is being increasingly fitted out with locally manufactured equipment. India's oil industry personnel has grown numerically and qualitatively. The country now has its own oil research institutes which are engaged in a number of oil-prospecting and production projects.

Further growth of Soviet-Indian cooperation in oil industry is being promoted by a working group in the framework of the Inter-Governmental Soviet-Indian Commission on Economic, Scientific and Technical Cooperation. In 1984 the group held two meetings in New Delhi and Moscow. Last summer a cooperation programme for 1985-1990 was signed in Moscow. At the same time, an agreement was reached on scientific and technical cooperation between Soviet and Indian oil research institutes to last until 1990.

CSO: 1812/142

GENERAL

UDC 621.643/553.002.2+62.001.7

ROLE OF CONSTRUCTION IN OIL, GAS PRODUCTION OUTLINED

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 10, Oct 84 pp 3-5

[Article: "Developing the Western Siberian Oil and Gas Complex"]

[Text] Among the diverse and complex economic programs being carried out by the Soviet people, the economic development of the oil and gas fields of Western Siberia, and mainly of Tyumen Oblast, holds a special place.

The CPSU Central Committee, the Central Committee Politburo and the Soviet Government have devoted constant attention to the Western Siberian oil and gas complex. The main directions for its development were defined in documents of the 23rd, 24th, 25th and 26th CPSU Congresses. The strategy and tactics for solving the economic and social problems of the new industrial region were worked out in a number of decrees of the CPSU Central Committee and the USSR Council of Ministers. Substantial material and technical resources and investment have been concentrated in Western Siberia, and assistance has been extended to the people of Tyumen by all areas of the country and by many ministries and departments. This has facilitated an influx of people into the region, a growth in intellectual potential, and the rapid and critical assimilation of the existing experience of developing new areas and developing oil and gas fields. As a result, high and stable rates of development have been achieved for the new industrial region.

The recent stage of developing the oil and gas fields of Western Siberia has established and further developed a new large-scale national economy complex that is currently maintaining a major growth in oil and gas extraction that is largely determining the fate of the country's fuel--energy balance.

Already by 1980 the relative significance of the Western Siberian oil and gas complex was more than one third of the total fuel extraction in the country. This year its share has grown still more, and has reached 43-45 percent.

The economic impact of the complex is extremely great. During the 11th Five-Year Plan alone more than 3 billion tons of hydrocarbon fuel (computed on oil) were extracted, the value of which exceeded 500 billion

rubles in world prices.

One of the important results is the fact that 1 million m^2 of territory has been economically developed and settled. Vigorous and creative mobile collectives with many members have been set up. Management cadres have grown up here that have gone through the school of conditioning and formation on Tyumen soil and have their own characteristic style of work.

These high tempos have not come about by themselves. Intense labor stands behind every ton of oil produced and cubic meter of gas recovered. And when we speak with pride today of the facts that the production cost of producing Western Siberian oil is lower than the industry average, that rates of developing oilfields have been achieved that are unheard of in worldwide experience (under similiar conditions), and that investments in the oil industry are recoverd in 1.5 to 2 years, we must remember that this has been done by the hands and minds of all the Soviet people.

One of the results of the recent stage consists of the fact that the region's oil and gas industry is developing on a foundation of widespread utilization of the latest advances in science and technology, of scientif scc orianization of labor and management, of advanced experience, and of the introduction of comprehensive automation and mechanization of industrial processes. The oil, gas and construction workers of Western Siberia have discovered and applied many interesting and highly effective methods of organizing the drilling, exploitation and equipping of fields, and have made a considerable contribution to the theory and practice of the oil and gas industry and of construction.

The following are among the progressive technical solutions proven in the new region: bringing in a field before the first-phase sections have completed exploration operations; using up-to-date methods to maintain formation pressure; modular-kit construction of oil- and gas-field facilities and of oil-pumping and compressor stations; joint and separate exploitation of several strata by a single well; broad use of ice and log roads, cluster drilling of oil and gas wells, hydro-alluviation for building foundations under drillsites and for artificial islands in swamps and lakes; development of special drilling rigs, hydraulic-giant drill bits, and high-momentum low-speed pipe drills; conversion to electric power for drilling, use of more powerful pumps and high-speed drilling, and the gaslift method of extraction. These and many other technical solutions derived from the keen intelligence of engineers and workers have produced a substantial effect, ensured high rates of developing the fields, and reduced the time needed to achieve design levels of output.

Tyumen oil workers have recently encountered a number of objective difficulties: there is an annual increase in the number of new fields brought in at a distance from the base and utilities that have been set up, and the relative amount of mechanized output increases, thus requiring additional operating personnel, equipment, etc. Under these conditions it is the task of the collectives of Minneftegazstroy /Ministry of the Con-

struction of Petroleum and Gas Enterprises/ to provide specific and timely aid to the oil workers to ensure that oilfield facilities, water lines, gas lines and oil collecting systems are put into operation ahead of schedule.

Western Siberia's gas industry is steadily developing. The resources of natural and oil by-product gas, the relatively shallow depth of occurrence of the producing strata, the high production rates of the wells, and the absence of corrosive impurities have made it possible to expand output at high rates. In a brief period the Medvezhyye Field reached its design output, and 11 facilities for the comprehensive processing of gas were built at Urengoy.

For the first time in worldwide experience and under the very difficult conditions of the Far North complexes have been built to produce 300 billion m^3 of gas annually. Many difficult problems of producing and transporting gas under northern conditions have been solved.

New construction of gas wells having an operating column of increased diameter has allowed a considerable increase in their rate of production and produced an impressive economic impact. Because of the battery placement of wells, the number of gathering lines has been reduced, and therefore the requirement for pipe. During construction of Comprehensive Gas Processing Facilities (UKPG) Nos. 7, 8, 9 and 10 at the Urengoy Field, there was large-scale use of the modular-kit method, which allowed a reduction in labor costs at the construction site. UKPG-9 was practically built in a year and a half, against a norm of 2.5 years.

Heavy-duty gas pipeline systems were constructed from pipe with a diameter from 1220-1420 mm, and compressor stations were built with units having a capacity of 10, 16 and 25 MW at a pressure of 7.5 MPa.

There has been wide use in construction of pile foundations and floating fill for vehicular roads and railroads, temporary roads with an unwoven roadbed (in place of expensive timber), laying of utilities without conduits by using water repellent to isolate the pipes, and the modular-kit method. The development of the Western Siberian oil-producing areas has convincingly demonstrated that this scientific and technical progress is a fact.

One of the decisive results of the past has been the establishment of a very powerful construction base, that is, large-scale construction collectives have been set up, construction industry and construction materials enterprises have been built, as well as housing construction combines, assembly and prefabrication plants and repair enterprises.

The present phase in the development of the Western Siberian oil and gas complex has some special features.

Volumes of oil and gas output are very high here, and are commensurate with those prevailing in the country 10-12 years ago. In 1984 alone Siberians will produce considerably more oil than was obtained in the 54 years of the country's pre-revolutionary oil industry.

The absolute figures in the annual growth of oil and gas production remain high. This year they amount to about 13 million tons of oil and 44 billion m^3 of gas.

Such growth rates for the oil and gas industry call for large and constantly growing volumes of investment and of construction and installation work. The Soviet people are used to the massive scale of construction and the fact that many of our construction projects are unique and world-class "projects of the century". However, there has never been anything like, or even close to, what is now under construction in Tyumen.

Minneftegazstroy organizations propose to complete 3.3 billion rubles worth of construction and installation work in Western Siberia in 1984, which is 1.6 times more than in 1980.

One feature of the present-day stage is that the degree of difficulty of the work is increasing. This is related to dispersal of forces and separation from the main waterways and established bases.

Whereas in the 9th and 10th Five-Year Plans work was concentrated primarily in the Samotlor Oilfield, now an ever greater number of lesser fields are being developed, that are remote from each other, as well as from industrial bases, transportation routes and populated places. However, the operation of several fields is being delayed because of a shortfall in the construction of hard-surface roads, poor engineer preparation of construction sites and routes, and lack of correspondence between certain design solutions and established requirements.

Accumulated experience shows that there is an urgent and serious need to solve many problems of developing the areas of the north. Their importance in the development of the oil and gas industry will constantly increase. The Far North poses much more difficult problems than those found in the Central Ob. A long-range and well grounded program is needed for a more vigorous advance to the north. This means a requirement for unprecedented investment in the infrastructure and in engineer site preparation, for the establishment of transport means to accommodate a large volume of heavy-duty traffic, and for new materials and structures suitable for areas of the north. The permafrost also presents considerable difficulty.

Serious scientific preparation should precede entry into northern areas. The north should be treated as an ally: the permafrost should be used to build roadbeds, and floods to deliver freight on minor rivers.

It is perfectly obvious that the development of the oil and gas industry, and of the entire Western Siberian oil and gas complex is wholly dependent on the activities of the construction organizations. We must introduce new facilities for producing oil, installations for complete gas treatment, gas-, oil-, and condensate- pipelines, pump and compressor stations, and a large amount of housing and facilities for cultural and personal services. All this requires considerable growth and strengthening of construction organizations and the establishing and developing of their base, the adoption of the latest methods of working and of organizing construction output, and a considerable increase in the work level of clients. Minneftegazstroy collectives have fulfilled the main tasks of the first three years of the five-year plan to build facilities and put them into operation. They have met the plans for construction and installation work. In these three years this area has turned over for occupancy housing with a total area of 3 million m^2, kindergartens with nearly 15,000 seats, schools for 19,000 students, and other facilities for social and personal services.

However, there are still many shortcomings in the activities of construction collectives.

Glavtyumentruboprovodstroy /Main Tyumen Administration for Pipeline Construction/ did not turn over in the prescribed period its assigned sector assigned of the Kholmogory-Klin oil pipeline, and it is working poorly on its main 300-km sector. Construction is behind schedule of the Urengoy--Surgut condensate pipeline and of several oilfield pipelines. Glavtyumenneftegazstroy /Main Tyumen Administration for the Construction of Oil and Gas Facilities/ is behind in the startup of gas lift stations at Samotlor, is doing poorly in producing tank capacity, and has not carried out its commitments for the ahead-of-schedule operation of several oil pumping stations. The Sibkomplektmontazh /Siberian Multipurpose Installation Trust/ Association has permitted a lag in the construction of oil facilities. Glavsibtruboprovodstroy /Main Siberian Administration for Pipeline Construction/ is working poorly on the construction of the Shaim-Konda oil pipeline and working at an unsatisfactory rate on the experimental sector of the gas pipeline designed for a pressure of 10 MPa. The Urengoy Glavk /main administration/ annually increases the volume of its work, and has found a quite effective system for constructing UKPG in a field. This year, however, it is behind in constructing the 11th facility, has not concentrated enough resources at the sites of extraction facilities and condensate treatment, and has not shown enough persistence in solving the problems of developing the Yamburg Field.

This year will largely determine the outcome of the five-year plan, both in the volume of gas and oil extraction and in the overall indicators of the production activities of the industry's construction organizations.

During the time left until the end of the year we must put into operation a considerable number of facilities for the extraction, processing and transport of oil, gas and condensate, as well as housing and facilities for cultural and personal services.

The congratulations of the CPSU Central Committee and the USSR Supreme Soviet on the occasion of the early completion of construction of the Urengoy-Center 1 gas pipeline produced a new surge of creative vigor and enthusiasm from labor collectives, intensified competition to complete assigned tasks ahead of schedule, and made it possible to set the tasks for the early completion of the last one of the gas pipelines planned for the five-year plan -- Urengoy-Center 2, so that it will be delivering gas by January 1985.

It is essential, by making use of the creative energy of the workers, to take steps so that all facilities planned for this year are put into operation, and to establish a springboard for the successful completion of the five-year plan.

The following are the main directions for improving the efficiency of construction in the Western Siberian oil and gas region: unprecedented development of the material and technical base of construction relative to the growth in the amount of construction and installation work; increasing the level of industrialization of the construction industry and wider utilization of the modular-kit method; improving the planning of capital construction and its organization and management; development and adoption of new technological processes; utilization of advanced support and enclosure structures; improving volume-planning decisions, and using advanced design solutions; and improving planning for the building and engineer preparation of industrial sites and populated places.

The industry's organizations have set up a substantial base in Western Siberia. Minneftegazstroy has invested nearly 3 billion rubles in the development of the industry's industrial enterprises in the region. There have been produced here 900,000 m^3 of precast concrete, 180,000 m^3 of gravel aggregate, 80 million rubles worth of modular-kit structures, and 960,000 m^2 of fencing panels from efficient materials.

However, the pace of setting up and reinforcing the base is presently lagging behind the requirements of construction organizations and the growing amount of construction and installation work. Western Siberian organizations satisfy 45 percent of their own requirements for cast concrete, and 26 percent for carpentry items.

Construction organizations have worked out and are implementing a broad program for further development of the base, that provides for a considerable increase in facilities to produce cast concrete, large-panel housing, etc. Construction is under way of the second stage of the Kharp Enterprise. In the future a major combine will be set up here with a capacity of 2.5-3 million m^3 of gravel, and 800,000-1 million m^3 of cast concrete. The Surgut and Nadym DSK /housing construction combines/ are to be enlarged and rebuilt, and expansion is being designed of the Tyumen Combine to include the conversion to an advanced model of houses, of the Urengoy DSK, and of the Bogandinskiy Plant for Aggregate Products. The Vinizili Combine is having a rebirth. It is planned to double its capacity and arrange for the production of particleboard panels, and, at

the same time, of prefabricated quick-assembly housing for site preparation in areas where construction workers are to be sent.

It must be mentioned that there has been little study in this region of the problem of town building in the light of specific conditions in the north. There is hardly anyone involved in designing the commercial-community zones in the new cities. Revision is needed of town building standards to take account of the youthful composition of the population of northern cities. Given their youth, there must be more construction of dormitories and housing for small families, of messhalls, libraries and kindergartens. Even though the tasks for building housing and facilities for cultural and personal services have recently been fulfilled here, what they have provided is still below average indicators for the republic.

The problems of the transportation system and the shortage in the oblast of local construction materials, together with the availability of large timber resources, require a constant search for new construction and volume-planning decisions. There must be broader use of wooden structures for commercial and civilian construction. There must be new designs, especially of temporary and shift structures, and enterprises to specialize in the manufacture of the required structures. This must be diligently worked on by GUKS /Main Administration of Capital Construction/, the Main Technical Administration, Glavnetegazpromstroymaterialy /Main Administration of Oil- and Gas-Field Construction Materials/, the industry's science, SibNIPIgazstroy /Siberian Scientific Research Institute of Construction for the Gas Industry/, and Siberian production units.

The industry's collectives are faced with the task of reducing the duration of construction and installation work in every way possible, improving the quality of it, and lowering production cost.

The solution to these problems is related to the adoption of advances in scientific and technical progress and improvement in the organization of work. Special attention was devoted to this very point in the decree of the CPSU Central Committee and the USSR Council of Ministers "Improving the Planning, Organization and Management of Capital Construction".

Occupying the foreground are the industrialization of oil- and gas-field construction, and the manufacture in plants of ready-made oil field facilities. The utilization of modular-kit construction has brought about a reduction in labor requirements for on-site work, shortened the length of construction time, accelerated the startup and development of fields, and considerably increased the efficiency of the construction industry. It remains to improve the modular-kit method, convert from separate facilities to modular fields, and more widely introduce super-blocks and other technical solutions. The industry's scientific potential and the achievements of other creative organizations in the country should supply construction workers with new materials that have high resistance to low

temperatures, and reliable and economical means of thermal protection for structures.

In Western Siberia there has been a testing of many new systems of organizing the construction industry; of large-scale technological complexes, which have simultaneously been transformed into integrated technological flows; expedited and shift methods; etc. It remains to improve them and to find new methods that will ensure further development of construction efficiency.

In August of this year the CPSU Central Committee and the USSR Council of Ministers adopted a decree on the development of the Yamburg gas-condensate field. Construction workers have been presented with difficult and responsible tasks. They are committed, along with the workers of the gas industry and other fellow workers, in very short times and under very difficult Transpolar and permafrost conditions, to produce gas at this field in increments comparable to those at Urengoy. Construction is to start in 1985 of an induistry new to the industry — a plant in Surgut to refine condensate to obtain motor fuel.

On the basis of the experience, acquired at no little cost, of developing the Western Siberian oil and gas complex, Minneftegazstroy construction workers will fulfill the tasks confronting them and make a decisive contribution to the country's Energy Program.

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IMPROVEMENTS IN OIL, GAS CONSTRUCTION DETAILED

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 10, Oct 84 pp 6-8

[Article by V. A. Aronov, Sibkomplektmontazh /Siberian Multipurpose Installation/ Association, Tyumen: "Effectiveness of the Modular-Kit Method of Construction"]

[Text] In endeavoring to make a fitting contribution to the execution of the decisions of the 26th Party Congress and of the June and November (1983) and February and April (1984) CPSU Central Committee Plenums on improving the efficiency of social production, the collective of the Sibkomplektmontazh Association is doing everything necessary to fulfill its intensified socialist commitments. In the fourth year of the five-year plan the intention is to increase labor productivity by an additional 1 percent, and to reduce construction costs by 0.5 percent more than in the plan. This will accordingly amount to 1.8 billion rubles in the annual volume of construction and installation work (SMR), and to 870,000 rubles of additional profit to the association. In order to accomplish this program it will be necessary to manufacture in plants an additional 620,000 rubles of modular items, or to produce about 50 modular boxes over plan, and subsequently assembly them at construction sites.

Following the instructions of the party and government, the association has embarked on a course to accelerate growth in labor productivity, increase the level of industrialization, and expand the number of oil and gas facilities built by the modular-kit method.

Thanks to the high degree of factory and installation readiness, three integrated gas treatment facilities (UKPG) were build in the past year in the Urengoy Gas Field. For the first time plant manufacture and assembly was introduced for a number of engineer facilities for towns and settlements, including water-softening stations and sewage-treatment facilities, with a capacity of 15,000 m^3 per day.

The number of facilities of supermodule design has expanded. Among these are supermodules for high-pressure pumping stations (DNS) weighing 400 tons completely readied at the plant (Figure 1). The first supermodules for the DE-25/14GM boiler have been delivered to the Yamburg Field. Production is being completed of four boiler supermodules for the area of

Lyantor Field. Preparations are under way for the manufacture and shipment by water of two large water intake modules, a cluster pumping station (KNS), and eight UKPG modules for Yamburg. At the development stage are a 1000-ton pontoon module and suspension equipment on a air cushion to transport it. All components of supermodules are fabricated in plants, and then further amalgamated at the assembly site.

To mechanize work and increase the output of supermodules, orders have been placed with the plants of Minrechflot /Ministry of the River Fleet/ for slip facilities equipped with a control panel, to be manufactured and delivered in 1985. The issue has been resolved of forming an association for large bridge and travelling gantry cranes. When this equipment becomes available in 1986-87, the association will be able to fabricate or assemble from supermodules the following items for the petroleum industry: KNS, DNS, oil treatment facilities (UPN), gas-lift compressors, compressors for transporting by-product gas, water-intake stations, and facilities for gas-refining plants (GPZ). Documentation exists for most of these facilities. UKPG, compressor stations, boilers, substations, power plants and other facilities for the gas industry can be assembled from supermodules.

An administration has been set up in the association for the assembly, transport and installation of large modules. With growth in volume, it should, in our opinion, develop into a combine to encompass all the main stages of the construction industry — fabrication, transport, erection on a foundation, and installation. With the establishment in the association of SKB Truboprovodtransmash /Pipeline Transport Machinery Special Design Office/ improvement is continuing of air-cushion means of transport to deliver large modules in areas of the north (Figure 2).

With the aim of further specialization and expansion of production of module-kit structures (modular boxes and panels of metal components), the association, together with the SibNIPIgazstroy /Siberian Scientific Research Institute of Construction for the Gas Industry/ has started to develop a project to reequip the Komsomol and Youth Experimental Plant for Modular Structures (KMEZBU). The SPKTB (Special Technical Planning and Design Office/ is working out the technology, outfitting, and non-standard equipment for a new modular boiler house with VK-21 boilers operating on gas or liquid fuel. A mechanized line has been set up to knurl the grooves of fire tubes. Fifteen dies and accessories have been designed. It is planned to produce at least 500 of these boiler houses per year, and it has been decided to transfer the production of them as technological modules to the the Plant for Modular-Kit Structures (ZBKU), where there are blanking shops, and where box assembly has been set up. It is therefore advisable, in our opinion, to duplicate the blanking operations at KMEZBU, and to send the substructures, framework and roofing there from ZBKU. The reequipping of KMEZBU will make it possible to improve the quality and increase the volume of output of panels, and in particular, to achieve a production of up to 400,000-500,000 m^2 of modular panels per year, and consequently of up to 12,000 modular boxes.

SPKTB has now found a solution that permits the casting of modular panels. The introduction of a line with continuous casting of FRP /expansion not given/ will increase labor productivity by a factor of four or five. It is planned to use the areas made available to expand the SPKTB experimental section and to establish conditions for the manufacture of equipment and mechanized lines.

The SPKTB experimental section has completed the production of a facility to obtain polyethelene gaskets. By means of compressed air, polyethelene foamed with freon is extruded by piston through spinnerets. Depending on the configuration of the spinneret, one can obtain a gasket of any cross section, suitable for sealing the joints in modular panels and in frame and panel buildings. This sealant material makes it possible to improve the construction of the panel joint and to mechanize the sealing of the joints.

One of the effective directions to lower the metal requirements of modular box components is the use of roll-formed sections obtained by bending a sheet cut from a roll. Installation is being completed of a line for the longitudinal and transverse cutting of sheet up to 2 mm thick. A decision has been reached on a line to cut and bend sheet up to 5 mm thick. The use of roll-formed sections of rolled sheet steel to manufacture the boxes of Project 672 (frameworks, bases, roofing, doors, gates, windows etc.) reduces the metal requirement up to 20 percent. More rational cutting will reduce scrap by a factor of two or three, permit the use of more efficient contact welding, and mechanization of the assembly of components.

The transfer of a quantity of work from the construction site to plant conditions ensures a considerable increase in the labor productivity of installation workers. Industrial production has been adopted for partitions, metal structural components, ready-made foundations, transient sites, and supports for on-site pipelines and trestles, all of which used to be fabricated directly at construction sites. These advances have been employed at UKPG-9 and UKPG-10, and are continuing to be adopted at installations of the Urengoy Field and in the oilfields of the Central Ob district. This favorable experience, which has had a significant effect, is also being disseminated to other installations of Western Siberia.

As noted at the February (1984) CPSU Central Committee Plenum, the intensification and accelerated application to industry of advances in science and technology, and the accomplishment of major integrated programs must all, in the final analysis, raise the productive forces of our society to a qualitatively new level.

An integrated target program to improve the economic mechanism in the Sibkomplektmontazh Association, programs to carry out measures to develop modular-kit construction in Western Siberia, and organizational and technical measures to ensure the fulfillment of annual plans have been directed toward further stimulation of production.

The accomplishment of these programs and measures provides for an increase of 16 percent in labor productivity by the end of the five-year plan, a substantial reduction in the amount of manual labor, and the adoption of new, progressive structural components and materials.

Analysis of the efficiency of construction of oil and gas facilities during the 10 years of the association's operations has shown that with the widespread adoption of the modular-kit method, the volume of construction work has declined, the area of construction sites has decreased, and the overall bulk of structures has gone down. It is of importance that this effect has been achieved in various spheres and directions.

First, the estimated cost of oil and gas facilities has decreased by 20-25 percent.

Second, there has been an 18-23 percent reduction in the production cost of construction, including a drop of up to 30 percent in the consumption of materials as opposed to the amount for an average structure. The total number of workers has declined by 15-20 percent, while the number employed at the construction site has decreased by 40-50 percent. Third, labor productivity has increased by a factor of from 3-3.6. Where in the initial years of construction in the oil and gas fields of Western Siberia the labor productivity of a single worker was 6,000-7,000 rubles per year, it has now increased, as a result of adopting the modular-kit method, to 50,000 rubles, which considerably exceeds the countrywide indicators for labor productivity in construction. Fourth, construction time has decreased by a factor of 2-3. Construction times for facilities of the oil and gas industry, as compared with the standard times conforming to SN /Construction Norm/ 440-79 in the traditional alternative, is shown in Table 1.

The economic impact of employing the modular-kit method (Table 2) per 1 million rubles of SMR has reached an average of 0.62 million rubles, including 0.3 million rubles in the sphere of construction, and 0.32 million rubles in the sphere of operation.

Analysis of the main production-economic indicators of the activities of the units of the association and of the construction and installation organizations building oil and gas surface facilities in Tyumen Oblast is evidence that to accomplish the same amount of SMR, the modular-kit alternative requires 20-30 percent fewer supervisory personnel, and 30-40 percent fewer workers overall.

With a reduction of three or four times in the amount of work on the surface portion due to the widespread adoption of the modular-kit method and the replacement of general construction operations with installation operations, it is possible to construct a facility with the personnel of a single enlarged brigade. The association is now setting up enlarged and self-supporting multi-purpose brigades numbering 40-60 members, and more. The main technical and economic indicators for workers of enlarged

brigades are shown in Table 3.

Table 1

Construction times for oil and gas facilities, in months

Facilities	Traditional alternative	Modular-kit alternative
Installing gas treatment facility (in a gas-condensate field), with a capacity up to 20 billion m^3 per year	22	7-8
Gas compressor station with a capacity of 50,000 kW	21	8-10
Oil-recovery cluster pumping station with a capacity of 20,000 m^3 per day	10	5-6
Oil pumping station with a capacity of 12,500 m^3 per hour	22	9-10
High-pressure pumping station for oil with a capacity of 30,000 m^3 per day	9	3-4
Waste treatment facilities with a capacity of 15,000 m^3 per day	17	9-12
Hot-water boiler with a capacity of 151.2 GJ	4	0.2-0.3
DE-25/14GM boiler with a steam capacity of 75 tons per hour	12	3.0-4.0

Table 2

Economic effect of adopting the modular-kit method of construction for typical facilities, in million rubles *

Facilities	Per 1 million SMR	Construction	Operation
Installation of gas treatment facility	0.81	0.58	0.23
Cluster pumping stations	0.55	0.22	0.33
Oil pumping stations	0.88	0.28	0.60
Boilers	0.26	0.21	0.05
Facilities of gas collection posts	0.62	0.12	0.49
Compressor stations	0.84	0.34	0.50
High-pressure pumping stations	0.55	0.22	0.33
Waste treatment facilities	0.13	0.13	-
Tank farm facilities	0.88	0.28	0.60
Other facilities	0.63	0.25	0.38

* Efficiency computed in conformity with SN 509-78

Table 3

Indicators of the work of the enlarged brigades of the Sibkomplektmontazh Association

Indicators	Years						
	1975	1976	1977	1978	1979	1980	1983
Amount of SMR performed by enlarged brigades, in million rubles	21.7	38.6	55.4	59.4	79.7	83.1	138.8
As a percent of amount planned	112.7	106.3	103.5	114.2	102.4	100.5	104.2
Number of enlarged brigades	12	24	31	29	38	40	60
Number of workers in enlarged brigades	225	459	618	722	974	1187	2035
Output per worker, in thousand rubles	96.7	84.1	89.6	82.3	81.9	70.0	68.2
Construction portion of total SMR performed by enlarged brigades, as a percent	47.0	57.0	67.0	66.0	63.2	80.0	86.8

With the adoption of the modular-kit method and enlargement of the primary collectives, opportunites have increased for brigade self-support. In spite of the subcontractor nature of the Sibkomplektmontazh Association, the volume of SMR performed by self-supporting enlarged brigades in 1983 reached 89 percent.

The high level of industrialization of work with the modular-kit method has created conditions for the rapid construction of major oil and gas facilities, requiring the presence of construction workers at assembly sites for only a short period, and utilizing the expedited-shift organization of labor.

The approximate economic impact (based on data obtained) from the use of the expedited-shift method in the construction of housing, social, cultural, personal service and other facilities comes to 1,000 workers: with an investment of 16.4 + 23.4 million rubles, and with operating costs of 0.40 + 0.55 million rubles per year. The investment in construction required per worker in the Central Ob districts has been fixed at 6,000 rubles, and at up to 16,000 rubles in the Transpolar area. Therefore, the combination of the modular-kit method with the expedited-shift way of organizing labor can, over the next 10 years, reduce investment in the development of the social infrastructure of Western Siberia by 1.2-1.8 billion rubles, just for construction workers. The effectiveness of modular-kit construction can be increased by a factor of 1.5-2, if several of the following problems are solved.

At the design stage. There must be developed and adopted a set of standard documents of an interdepartmental nature that would regulate the level of industrialization of design solutions and their technological effectiveness with regard to in-plant fabrication, transportation, and

assembly at construction sites, and that would also include questions of unifying and standardizing general plans, volume-planning and construction decisions for modular-kit structures, and components of metal structures (stairways, catwalks, servicing platforms, scaffolding, etc.), of enclosure structures and of pipe assemblies. Furthermore, because of the adoption of limited standards for pipe and for shaped and sheet rolled stock, there must be a reduction in the number of standard sizes and brands of materials, and also an establishment of common methods of determining wholesale prices for BKU /modular-kit structures/, including very large modules. The matter has not been resolved of apportioning the accountability for amounts of unfinished production -- plant output -- between customers and prime contractors. In many oil and gas facilities today the level of industrialization of the zero cycles is lower than for the surface portion. There must be wider adoption of very large modules wholly fabricated in plants.

At the stage of preparing the production and in-plant fabrication of BKU. It is necessary to develop and implement a system of steps to promptly formulate a product-range plan for plants and for the association as a whole. A long-range program is required to expand specialization and to shift BKU plants into industrial balance, by transferring the role of customer to the enterprises when making up lists of equipment. To increase the level of mechanization and automation of in-plant fabrication, and the output of BKU to 12,000-15,000 items per year rather than the planned 8,000, we must expand and outfit experimental production (shops to fabricate non-standard equipment and mechanized lines), and also set up large-scale toolbuilding (to manufacture dies, accessories, non-standard tools, and means of small-scale mechanization). We must ensure the adoption of flexible automated technological systems and industrial robots. We must accelerate the construction and operation of bases for the assembly of large modules.

At the delivery stage of BKU and very large modules. We must develop and adopt normative documents to standardize the design of facilities from very large modules. It is therefore necessary to consider the feasibility of first arranging for the manufacture in plants of units and sections of pontoon modules and later of consolidated equipment, with the subsequent delivery of large modules to assembly sites. For the further development of large-module construction it is necessary to set up means to transport modules weighing up to 2,000 tons by water and land without a metal-intensive pontoon unit. These means could be special submersible barges and self-propelled caterpillar trucks with winches to load the modules onto the barges and later unload them, transport them overland and install them on the foundations.

At the stage of installing BKU and very large modules. All surface structures, regardless of functional designation, should be of the module variety and have a high level of industrialization. Standardizing documents of an interdepartmental nature are also needed for this. We must ensure record construction of roads, trails, and supply

dumps, and of the zero cycles overall, and also to develop and adopt the optimum technology for continuous joint installation by the forces of several enlarged mechanized brigades. Across-the-board outfitting with means of small-scale mechanization is needed.

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ECONOMICAL OIL, GAS CONSTRUCTION METHODS PROMOTED

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 10, Oct 84 pp 10-12

[Article by L. A. Zinov'yev, V. N. Prikhod'ko, A. Kh. Mukhametzyanov and V. V. Prikhod'ko, Glavtyumenneftegazstroy /Main Tyumen Administration for the Construction of Oil and Gas Facilities/, Tyumen: "Advanced Equipment and Technology for Constructing the Oil and Gas Facilities of Western Siberia"]

[Text] The ever-increasing volume of capital construction presents the organizations of Minneftegazstroy /Ministry of Construction of Petroleum and Gas Industry Enterprises/ with the high-priority task of accelerating scientific and technical progress.

The main directions for technical progress in the components of Glavtyumenneftegazstroy are related to steadily improving the level of industrialization and the efficiency of construction, reducing material consumption, adopting new machines, equipment and technological processes, increasing labor productivity, and improving the quality of work. Glavtyumenneftegazstroy is working closely and creatively with 16 scientific-research and design institutes of Minneftegazstroy, Minnefteprom /Ministry of the Petroleum Industry/, Mingazprom /Ministry of the Gas Industry/, and other ministries and departments. In recent years the specialists of the main administration and its components have implemented wholly new technical solutions that have achieved a wide range of work, from theoretical and experimental research to experimental-industrial and serial adoption by construction and installation organizations. Such components as the Siborggazstroy /Siberian Gas Construction Organization/ firm and the Spetsneftegazstroy /Special Oil and Gas Construction/, Nefteyuganskspetsgidromekhanizatsiya /expansion not given/ and Tyumengazmekhanizatsiya /expansion not given/ trusts are not only performing construction-installation and startup-adjustment work, but they are also fabricating non-standard equipment, producing materials and adopting advanced technology.

The above-ground installation of mains and production pipelines during the development of oil and gas fields has considerably increased the efficiency of production. The adoption of this technology by the components of the Spetsneftgazstroy Trust has permitted the maximum

mechanization of installation work and avoidance of labor-intensive earth-moving work, a reduction in the installation time for mains and pipes by a factor of 2-3.5, an increase in labor productivity of 60 percent, improvement in the quality of work, and the creation of favorable conditions for the maintenance of these mains and pipes.

The adoption of light-weight foundations without mats and on cast-in-place or tubular piling beneath the components of compressor and oil-pumping stations of the main pipelines in the Central Ob region and in the Far North has made it possible to reduce labor costs by a factor of 5.6, to increase labor productivity by a factor of 4.8, and to reduce the construction time for KS /compressor stations/ by 2-3 months.

Considerable savings have therefore been achieved of 320 m^3 of precast concrete, 1150 m^3 of slab concrete and 168 m^3 of lumber. The economic impact from the adoption of light-weight foundations amounts to 1.1 million rubles.

Work is continuing to improve the construction of foundations under oil- and gas-pumping facilities. Steel frames will be replaced with steel caps, which will considerably reduce the metal requirement for foundations. Along with new types of framework structures for the foundations beneath the components at gas-lift KS, matless structures for foundations will be built of concrete pilings measuring 30X30 and 35X35 cm. The Siborggazstroy firm has set up a special laboratory for this.

Glavtyumenneftegazstroy is devoting much attention to improving anticorrosion protection for the metal structures of oil tanks and of oil production equipment. Normative and design and production documentation has been developed and approved for protective devices against internal corrosion for oil tanks with a capacity of 5,000, 10,000 and 20,000 m^3.

In 1983 protective devices were installed in tanks with a total volume of 252,000 m^3. As a result, there were savings of 38 tons of epoxy resins (provided for protection in Minnefteprom designs), 226 tons of metal structures (the need to install metal scaffolding has dropped), and 340 m^3 of lumber. Labor requirements have declined by 7,900 man days. The economic impact amounts to 9.02 million rubles.

Four oil tanks with a capacity of 50,000 m^3 each and with active cathodic protection against electro-chemical corrosion have been put into experimental-industrial operation. This type of protection, even when compared with passive cathodic protection, makes it possible to reduce costs in the construction process by a factor of 1.2, operating costs by a factor of 1.5, and to double the life of anticorrosion protection.

Fireproof metal structural components and fireresistant equipment with phosphate coatings have been introduced at compressor and oil-pumping stations. The economic impact from the use of this method is more than 350,000 rubles.

In the Western Siberian region there has been widespread development of the modular-kit construction of oilfield facilities, and of the oil- and gas-pumping stations of the main pipelines. In 1983 the level of employment of the block method in the erection of industrial facilities by the main administration grew by 46 percent. As a result, the costs of transporting structural materials declined by a factor of 8, startup times for the facilities were reduced by a factor of 3-4, and labor productivity increased by a factor of 5-6. Economic effectiveness consisted of 38,200 rubles per 1 million rubles of construction and installation work.

Glavtyumenneftegazstroy is devoting much attention to the adoption of material-conservation technologies. The task has been assigned of utilizing the fine sands and sand-gravel mixtures of Surgut quarries instead of expensive imported gravel. Together with the Kiev Institute of Construction Engineering, the main administration is developing slag-alkali binders and products made of them. Non-granular Ural blast-furnace slag and water glass are expected to be used as the raw material for the production of slag-alkali binders. The first experimental batch of paving blocks and pilings of high-strength ferroconcrete have been produced at a ZhBI /reinforced concrete products/ plant at the Surgutneftegazstroyindustriya /Surgut Construction for the Oil and Gas Industry/ Trust. A shop to grind blast-furnace slag is being built in Surgut for serial production of these items. The adoption of this technology will made it possible for construction workers to avoid importing portland cement and gravel. The annual economic impact from the use of slag-alkali binders is expected to be 2.5 million rubles.

A result of the three-year cooperation with the Institute of Rock and Silicates (in Yerevan) has been the construction in Surgut by the Siborggazstroy firm of an experimental facility to make water glass from Tyumen diatoms. Adoption of this technology will provide savings of 76 rubles for each ton of water glass. Deserving of attention is the idea of obtaining a cheap siliceous material from diatoms. The effect of using slag-alkali concretes will then increase even more.

The Spetsneftegazstroy Trust has developed and adopted a semiautomatic process for manufacturing two-ply thermal insulation for pipeline. The insulation consists of a layer of FRP-1 /expansion not given/ and a layer of polystyrene foam, which enable effective utilization of the properties of the constituent materials (they reduce heat loss and water absorption).

In cooperation with scientific research institutes, the Spetsneftegazstroy Trust is conducting experimental work on the construction of heating systems out of self-compensating corrugated pipe, and also by utilizing bellows joints. These new developments will permit a considerable reduction in the cost and time to construct heating systems.

The establishment will be completed of an experimental base in Surgut of the Siborggazstroy industrial equipment firm. The base will include: a

shop to produce heating tape accessories for pipe and articles based on them; a metalworking shop intended for the production of pilings and frames for the foundations beneath the components of oil-pumping and compressor stations and for non-standard equipment. The intention is also to build shops here to produce materials for electrochemical protection, as well as means of small-scale mechanization and standard tool kits. Startup of the firm's experimental base will make it possible to accelerate the adoption of the latest advances in construction.

The main administration is devoting much attention to further improving the reliability of the equipment used.

As a result of creative cooperation with the scientists of the Institute of Electrowelding imeni Ye. O. Paton, the Nefteyuganskspetsgidromekhanizatsiya Trust has adopted a technology for renovating the rapidly wearing parts of dredges and construction machinery by the method of hard-facing them with powder wire. As a rule, semiautomatic machines perform these operations. The adoption of this process in 1983 has made it possible to increase the life of the parts by a factor of four, increase labor productivity by a factor of five, and achieve an economic impact of 670,000 rubles.

The Tyumengazmekhanizatsiya Trust has adopted a method developed by the Omsk Highway Institute for testing hydraulic systems. On the basis of this method malfunctions in hydraulic drives have been prevented, and that ensures a longer operating life for construction machinery and mechanisms. A self-supporting section of the trust has already produced an experimental mobile facility for testing hydraulic systems.

Progressive forms of organizing and motivating labor occupy an important place in the measures designated by the Communist Party to improve the economic mechanism. The main administration is doing serious work to increase labor efficiency and make wages and bonuses more dependent on the personal contribution of the workers and on the final results of the work of the whole collective.

To set up platforms in record time beneath the construction of oilfield facilities located in boggy and swampy areas far removed from industrial bases and widely dispersed, the Nefteyuganskspetsgidromekhanizatsiya Trust has organized eight self-supporting mechanized units. The organization of the units — into brigades each working on a single assignment and consisting of 50-85 men (machinists, drivers, fitters, lathe operators, welders, engineering and technical personnel, etc.) — has proven fully justified. The adoption of the new technology of setting up platforms has made it possible to concentrate equipment in the units to process large amounts of sand and transport it to considerable distances. As a result of organizing the mechanized units, the efficiency of the work has increased 22-34 percent, while its duration has decreased by 37 percent, and labor costs have declined by a factor of 1.3-1.5.

To improve the operational management of construction the IVTs /Information and Computer Center/ of Glavtyumennetegazstroy has set up a subscriber network to collect, process and display information. The network consists of four information studios equipped with data transmission facilities (TAP-2/A and TAP-3/A) and means of displaying information on screens (AP-64 displays). The relative economic impact from improving the operational management of construction has been calculated at approximately 3.5 million rubles.

During 1983 the main administration's units overall put into operation 120 procedures for new equipment and advanced work technology. As a result a relative economic impact in the amount of 10.1 million rubles was obtained, and 640 workers were freed for other production work. The implementation of these procedures made it possible to save 1,396 tons of metal, 1,470 tons of cement and 846 m^3 of timber and other material, equipment and energy resources.

A considerable contribution to the development of progressive equipment and advanced construction technology in Western Siberia was made by efficiency experts and inventors. In 1983 they put forth 1,436 proposals and inventions, from which savings of 5.47 million rubles were realized. There are more than 150 creative multipurpose brigades in the main administration's units.

The most creative brigade (of the Surgut KPP /Combine of Industrial Establishments/ of the Surgutneftegazstroyindustriya Trust), which includes Comrades Tolpygo, Perov and Zaytsev, developed and put into operation 24 innovative proposals, for savings of 75,400 rubles.

Glavtyumenneftegazstroy experts have decided to develop more than 200 various procedures in 1984-85 for the production and adoption of new equipment. The anticipated economic impact has been determined to be 22 million rubles. This will facilitate further acceleration of scientific and technical progress in the construction of oil- and gas-field facilities in Western Siberia.

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NEW METHODS OF PIPELINE CONSTRUCTION APPLIED

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 10, Oct 84 p 12

[Article by V. N. Yagovkin, Glavsibtruboprovodstroy /Main Siberian Administration for Pipeline Construction/, Tyumen: "Exploiting Scientific Potential in the Construction of Trunk Pipelines in Western Siberia"]

[Text] The components of Glavsibtruboprovodstroy have accumulated a decided amount of experience in developing and adopting the latest methods of construction. This has been facilitated by enlisting the scientific and design forces of related ministries and departments whose technical orientation meets the problems of developing Western Siberia.

Let us review developments for the period since 1981 that have been implemented on a self-supporting contract basis and successfully applied.

These are mainly new methods of pipelaying under the northern conditions of Tyumen Oblast developed by VNIIST /All-Union Industrial Institute of Petroleum/.

The high degree of flooding in the area of Western Siberia and the presence of permafrost soils that provide no means of support during thaws and have poor holding properties have a considerable impact on pipeline construction times. New design solutions are therefore required to ensure a fast pace of work and the reliability of the systems built. With traditional subsurface pipelaying under these conditions, a pipeline requires ballasting for nearly its entire extent.

Many difficulties are encountered in earth work, which in a good number of sectors can be accomplished only in wintertime. Experience has shown that under the conditions of Tyumen Oblast pipelines may come to the surface or be displaced, and that dikes can be destroyed. To ensure the reliability of systems under construction, a method developed by VNIIST for efficiently combining surface and subsurface pipelaying has been adopted, as well as ballasting with a non-woven synthetic material. All this was utilized in constructing the pipelines to Novopskov, Petrovsk and Uzhgorod.

Glavsibtruboprovodstroy and the Orgtekhtruboprovodstroy /expansion not given/ Trust have developed a method of ballasting with AR-401 anchors. AR-401 anchors have great bearing capacity, and have made it pos-

sible to accelerate the construction of trunk gas pipeline, which has considerably reduced the cost of ballasting.

A method of locating leaks in pipelines with the aid of a dye developed by the Tyumen Industrial Institute has been used successfully for several years in hydraulic tests of trunk pipelines. More than 1,400 km of pipelines have been tested. The economic impact has been 860,000 rubles, against development costs of 130,500 rubles.

Deserving of attention is a method of equipping crossings on ice with thermosiphon devices, as suggested by the KF /Krasnodar Branch/ of VNIIST.

In Western Siberia river crossings are constructed by the method of layered freezing. However, the use of these crossings does not in every case meet the time and weight requirements for the movement of cargo and construction equipment. The first stage of development was to construct a crossing in wintertime and over small rivers up to 7 m deep. Reinforcement was achieved by using thermosiphons to freeze ice support columns (pillars) under the crossing. Work is currently going on to increase the bearing capacity of the ice sheet on large rivers without the need for support on the bottom. All this will considerably accelerate the delivery of equipment to the right-of-way in wintertime.

Broad use is being made in Western Siberia of technological solutions worked out by the Tyumen Industrial Institute to stimulate pipeline construction. An efficient tool has been produced for the inter-layer removal of slag from the surface of weld seams. An experimental model has been tested in the Severtruboprovodstroy /Northern Pipeline Construction/ Trust. Induction heating has been tested at Urengoy Field reservoirs for the preliminary heating of pipe joints 1,420 mm in diameter prior to welding. This flameless device has a high heat output and is safe to use. The institute is now developing a technology for a thermo-mechanical method of cutting trenches in permafrost soil.

VNIIzemmash /All-Union Scientific Research Institute of Earth Moving Machinery/ has produced chain-operated equipment for trenching in permafrost soil. There is a requirement for a wholly new cutting tool, capable of digging trenches 300-350 mm wide and up to 3 m deep in permafrost areas. The successful development of this equipment will make it possible to use the slot-blasting method in the process of constructing trenches for a gas trunk pipeline. All this will improve the efficiency of using construction equipment, ensure growth in labor productivity and considerably improve the overall cost of earth-moving work.

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WAYS TO REDUCE AIR, WATER POLLUTION RECOMMENDED

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 10, Oct 84 p 22

[Article by V. K. Shmidt, Sibkomplektmontazh /Siberian Multipurpose Installation Trust/, Tyumen, under the rubric "Environmental Protection": "Preventing Environmental Pollution from the Combustion of Fuel in Boiler Houses"]

[Text] The efficient utilization of fuel during combustion in small-capacity boilers does not always receive the necessary attention. However, the total fuel consumption in boiler houses designated to supply heat to facilities of the oil and gas industry is great, and improving the efficiency of its use is an important national economic task. Fuel losses are directly related to environmental pollution. Reducing these losses therefore means solving two problems: improving the efficient utilization of fuel and protecting the air and bodies of water from pollution.

The air is polluted by harmful constituents in the products of combustion. These are the oxides of sulphur, SO_2 and SO_3, and of nitrogen, NO; and the products of incomplete combustion of the fuel, carbon monoxide, soot, etc. Air pollution by sulphurous gases stunts plant growth and has a profound impact on the soil-plant system.

To ensure the complete combustion of gas it is necessary to use gas burners that have a self-regulator and that make it possible to maintain the optimum proportion of gas and air. When burning sulphur-bearing fuel the ratio of air excess in the burner should be 1.01. When operating with a small excess of air, the sulphur burns to SO_2; this prvents the formation of the more aggressive oxide of sulphur, SO_3.

Particular attention must be devoted to the adoption of automatic devices to detect incomplete fuel combustion. Until these devices can be supplied to boiler house facilities, the completeness of fuel combustion can be checked by manual gas analyzers.

Mazut, or the oil residue obtained in the process of oil refining, is widely used as boiler fuel. Small-scale boiler house facilities mainly use mazut of medium viscosity — Grade 41.

A considerable amount of fuel contains excess moisture. Water gets into mazut during transportation by the river fleet, during dumping from railroad tank cars, as a result of leaks in the pre-heating facilities preparing mazut for combustion, and from the entry of ground or flood water into the drainage conduits of fuel-feed stations, and then into a liquid-fuel storage tank. When separating mazut from moisture, there is a possibility of forming water locks that could interrupt the steady feed of fuel to the burners, and this could complicate the operation of boiler house facilities.

Discharge of mazut-contaminated water is totally impermissible, and therefore the creation and proper operation of purification facilities, including oil traps, settling ponds and quartz filters, is of special importance for the protection of bodies of water.

The manufacture and installation of oil traps does not present any difficulties, either directly at a construction site or under factory conditions in the form of an integrated component. *

The treatment of mazut-contaminated water in order to separate the liquid fuel presents certain difficulties. It should be noted that, with an increase in moisture content, the heating power of fuel oil declines to a considerably less extent than its combustion temperature. Thus, with a 50 percent moisture content in mazut, the lower combustion temperature declines by a factor of more than 2 — from 38,800 to 18,000 kJ/kg, but the heating power declines by only 15 percent — from 2,130 to 1,800°C. Even with a moisture content of 70 percent the heating power of mazut corresponds to that of cut turf or blast-furnace gas.

It is therefore possible to burn watery mazut if the moisture is evenly distributed throughout its mass. There is a procedure for the burning of fuel oil with a high moisture content in the form of a fuel-water emulsion, made by mixing fuel and water.

The experience of operating boilers on liquid fuel in several Ural enterprises testifies to the possibility of using the following methods of mixing fuel with water.

A pipe perforated over its entire length is connected to the service tank, in the zone of the intake nozzle, to supply compressed air (diameter of the perforations is 5-7 mm). The mixing of the mazut takes place in the entire volume of the tank, but it is most intensive in the zone of the intake nozzle, which makes it possible to prevent the entry of moisture in the form of a massive water lock. When there is no source of compressed air, the mixing of mazut in a service tank can be accomplished with the aid of a pump. Mazut from the lower layers of the service tank

* Shmidt, V. K. "Methods of Remedying the Entry of Water into the Burners of Boilers Operating on Mazut" — PROMYSHLENNAYA ENERGETIKA, 1981, No. 7.

is picked up by pumps and fed again into the same tank, but into the upper layers of the zone opposite the intake zone. These methods are simple and quite effective. They completely exclude the discharge of water contaminated by oil products.

To keep the environment clean it is important to use methods of combustion that will completely exclude from the products of combustion soot and the host of complex organic compounds that accompany it. The best, most reliable and also cheapest protection of the environment is to ensure the combustion in furnaces not only of the main bulk of the fuel, but of everything that can burn, that is, the oxides of carbon and of the gaseous hydrocarbons and heavier organic compounds that form soot.

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AUTOMATED SYSTEMS IN PIPELINE CONSTRUCTION DETAILED

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 10, Oct 84 p 28

[Article by N. A. Bondar', Kazymtruboprovodstroy /Kazym Pipeline Construction/ Trust: "The Adoption of Automated Systems for the Control of Technological Processes"]

[Text] The construction of trunk pipelines represents a unique assembly-installation belt, with its inherent requirements for a system of organizing control: precise technological interconnection of operations and the resultant need to synchronize the elements of a cycle, and precise operational monitoring of numerical construction indicators and direct control of the rhythm of production by these indicators.

One of the effective directions for improving the organization of construction production during the building of trunk pipelines is the use of automated systems.

In January 1984 industrial operation began in the Kazymtruboprovodstroy Trust of the startup complex of an automated system of control of technological processes (ASU TP) of the linear construction of trunk pipelines. Program-informational and operational support of this complex is accomplished by technical means consisting of peripheral devices, systems of transmission, reception, information processing and presentation by operational and production-control personnel.

The organizational base of ASU TP is the operational and production-control service. An SM-1 computer, a Sigma telautomatics system, and ultra-short-wave radio sets have been installed in a specially equipped production-control post. Every 15 minutes several types of information arrive here from technological facilities: volume of work, number of quality discrepancies, and the status of the unit (working or not working) and three different reasons for shutdown. At the first stage of the adoption of the system these data were obtained from the trust's three pipe-welding bases. There are two types of sensors at each rack: a welding-current sensor installed in a VDU-2000 housing and consequently contained in the welding head, and a counter located on the line of movement of the pipe lengths.

At the rack control console there is a unit for the manual input of information on the reason for a shutdown. The rack operator has only to throw a switch to the position corresponding to the reason for the shutdown. Even when the switch is not thrown, the shutdown will be visible on the computer display screen, and information will be immediately sent to the one responsible for that type of work.

For the output of information, the SM-1 computer used in the automated system has a digital printer, a display, and a device for output on perforated tape; and input is from perforated tape. The content of each recording is given in algorithms of the computer programs that make up these recordings. The forms in which output information is presented are divided into operational reports and shift-accounting documents. Computer operational reports appear on the display screen, and can be routed to the printer on the initiative of the Sigma device. The Sigma device includes a system for the preliminary processing of data, converting them for coded transmission, receiving and decoding.

The components of the technical means for the ASU TP of the line construction of trunk gas pipelines are made from the technical documentation of the Proyektneftegazspetsmontazh SPKB /Planning and Design Office of the Main Administration for Specialized Oil and Gas Installations/. The teleautomatics system of the Sigma-1 can collect and process reports from 255 peripheral posts (machines and construction operations), and receive up to eight different reports from each one. The equipment of these posts is in a special container. It consists of the peripheral post's telautomatics device, a device for preliminary information processing, and radio sets with a power supply.

In the near future these containers will be installed in the welding and insulation units of the Kazymtruboprovodstroy Trust. These automatic systems will make it possible to identify the numbers of the routes and the pipeloads.

The next stage in the adoption of the automated system will have an annual impact of no less than 200,000 rubles. But before that we must solve problems of training specialists, stabilizing the electric voltage, and, most important of all, improving the quality of the organizational and managerial support of the line construction of trunk pipelines.

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CONFERENCE-CALL COMMUNICATIONS DESCRIBED

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 10, Oct 84 pp 28-29

[Article by V. A. Averin, V. N. Zakharov and S. F. Mal'tsev, Tyumenneftegazstroysvaz' /Tyumen Administration for the Construction of Communications for Oil and Gas Facilities/: "The Organization of Operational Control and Monitoring During Construction"]

[Text] Conference calls have played an important role in operational control and monitoring during the construction of a number of startup oil and gas facilities located in the vast territory of Western Siberia.

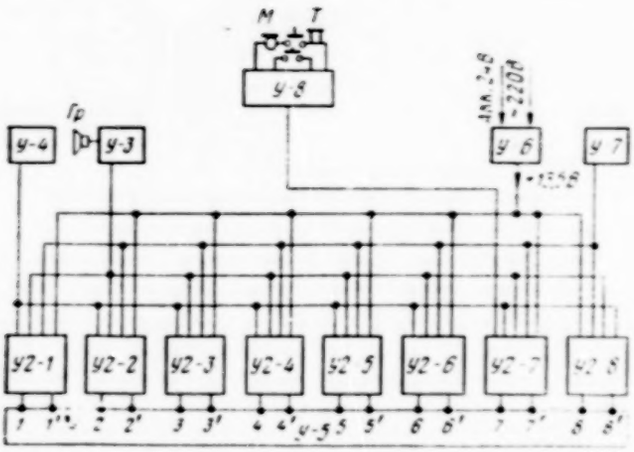
In setting up communications via conference calls, the management of Tyuumenneftegazstroysvyaz' has had to use channels belonging to the Ministry of Communications other departments. This has created additional technical requirements for quality in the connecting cable communications lines between the communications centers of the various departments.

To ensure high quality communication during conference calls, there must be appropriate organization, technical preparation and checking of both the main and the stand-by communications channels, a reliable source of electric power, and coordinated and precise work by technical personnel. For example, to prevent disconnections due to fluctuations in the power source, all the R-404 radio relay stations of the Surgut-Urengoy communications line must be converted to a source from their own diesel-generators.

Type MSS-12, MSS-2 and OGMTS-18 communications equipment is used for the switching and distribution of communications channels. Type ML-19 microphones with microphone preamplifiers and 15KZ-2 sound columns have acquitted themselves well in the studios of the main administrations and trusts. At the construction sites of compressor stations the offices of the construction staffs are generally used as studios. Here you find the studio's terminal equipment -- UD-2 duplex amplifiers, UMS-2 studio microphone amplifiers, and UA-2 subscriber amplifiers.

Engineers of the central laboratory of A. G. Fedyunkin and M. V. Osipyuk have developed the PSS-6 conference-call console with six channels (see Sketch). Six four-line communications channels and a studio can be

connected to it.



Sketch
Block Diagram of PSS-6 Conference-Call Post

1-8 — Inputs; 1'-8' — Outputs; Y-2 — Channel Amplifiers;
Y-3 — Acoustic Control Amplifier; Y-4 — Call Generator;
Y-5 — Mixer Field; Y-6 — Power Unit; Y-7 — Level-Control Unit;
Y-8 — Service Communication Unit

This console makes it possible: to put all subscribers connected by the channels (by switching into or out of any of the channels) into conference communication with the possibility of conversing and addressing any subscriber; to achieve acoustic control during a conference; and to conduct a service conversation on all channels with the aid of a handset. The console can send a call tone signal on any channel. The input and output levels of the signal of all six channels are controlled by an indicator. The level can be regulated for the input of all channels. The console is supplied from a circuit with an alternating current of 220 V or from a direct-current source of 24 V.

To simplify the layout in the console, there is no provision for noise suppressors on the channels or for the possibility of feedback control. The operator disconnects mannually by key.

The heart of the PSS-6 console is the distribution of the voice links, which is accomplished by eight channel transistor amplifiers joined in a mixer field.

The distributor has eight inputs and the same number of outputs, of which six are used to connect the four-line high-frequency channels, and two inputs and outputs to connect the studio and the service handset. Through the mixer field the distributor can transmit voice links from the

input of one of the four-line channels to the output of all the others, except its own.

PSS-6 consoles have been used at channel branching points in Mezhdurechensk, Demyansk, Nefteyugansk, Kogalym, Noyabrsk, Igrim and Belyy Yar. With their aid, conference-call communications were set up for the construction of the Kholmogory-Klin oil line, the Urengoy-Surgut condensate line, and the Urengoy-Pomary-Uzhgorod and Urengoy-Center 1 gas lines.

Terminal control consoles capable of connecting two or three channels are needed at the construction sites of oil-pumping and compressor stations, in the housing areas of industrial activities, and in construction offices at oil and gas fields. A console of this type, the PSS-3, was developed in 1984 by the personnel of the central laboratory of the Tyumenneftegazstroysvyaz' Administration. The PSS-3 has the same technical capabilities as the PSS-6 console, but is designed to connect three- and four-line communications channels.

To further improve the organization of control, steps are being taken that are directed at improving the quality and operating reliability of existing communications lines, improving the technical preparation of communications systems and channels, and developing cooperation among service personnel.

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